

**CLAIMS**

We claim:

1. A method of interpreting a repeated surface using a computer, comprising:
  - a. interpreting each overlapping component of a plurality of overlapping components of a repeated surface;
  - b. logically associating each overlapping component with the interpretation;
  - c. storing the interpretation in a computer memory; and
  - d. managing the interpretation of the repeated surface as a single entity.
2. The method of claim 1, wherein interpreting each overlapping component further comprises at least one of (i) replacing a previous interpretation with a new interpretation that overlaps an existing interpretation or (ii) creating a new interpretation.
3. The method of claim 1 wherein managing the plurality of components further comprises:
  - a. assigning a horizon name to the plurality of components, the horizon name comprising a predetermined pattern of alphanumeric characters for the horizon name; and
  - b. managing a repeated surface on the basis of the content of its assigned horizon name.
4. The method of claim 3, wherein:
  - a. commonality of a portion of the predetermined pattern of the horizon name may be used to identify a normal surface as part of a single repeated surface.

5. The method of claim 1, further comprising:
  - a. using a pointing device to aid with an interpretation task;
  - b. identifying a component as part of an existing repeated surface by depressing a predetermined key on a computer keyboard while using the pointing device;
  - c. generating a normally interpreted surface by interpreting an identified first existing repeated surface without depressing the predetermined key; and
  - d. identifying the identified first existing repeated surface as a component of an existing repeated surface by depressing the predetermined key while interpreting a second desired surface.
6. The method of claim 5 further comprising:
  - a. identifying the first existing repeated surface by using the pointing device and clicking on the first existing repeated surface.
7. The method of claim 5 further comprising:
  - a. selecting the existing repeated surface from a list of existing repeated surfaces.
8. The method of claim 5, wherein:
  - a. the existing repeated surface identified is the repeated surface last interpreted when the predetermined key was not depressed.

9. The method of claim 1, further comprising:
  - a. assigning a repeated surface to a collection, comprising:
    - i. interpreting a plurality of surfaces by providing each of the plurality of surfaces with a name adapted to be recognized by a computer, the name further being distinct from all other names for surfaces currently stored in the computer memory; and
    - ii. replacing each previous interpretation with a surface where such interpretation is overlapped by a surface with the same name.
10. The method of claim 9 wherein assignment to a collection comprises:
  - a. entering text into a data structure; and
  - b. associating the text with a surface name;
  - c. wherein the text comprises a name of the collection and the text being associated with a surface name.
11. The method of claim 9 wherein:
  - a. assignment is accomplished by graphically dragging the name to a collection.

12. The method of claim 1, wherein managing the new interpretation of the repeated surface as a single entity comprises at least one of (i) deleting surfaces as a group, (ii) exporting surfaces as a group, (iii) labeling surfaces as a group in displays, (iv) fitting mathematical surfaces to interpreted surfaces as a group, (v) contouring interpreted surfaces and resulting mathematical surfaces as a group, (vi) display of surfaces in map view as a group, (vii) converting surfaces in time to surfaces in depth, (viii) converting surfaces in depth to surfaces in time, (ix) changing label characteristics such as fonts, (x) changing the color used to display surfaces, (xi) turning on and off display of surfaces as a group, (xii) shifting a set of surfaces in time or depth by a constant amount, or (xiii) shifting a set of surfaces in time or depth to attach to a feature of the seismic data such as a peak or trough.

13. The method of claim 12, wherein fitting mathematical surfaces to interpreted surfaces as a group further comprises managing the resulting mathematical surfaces as a group.

14. A system for managing a repeated surface comprising seismic data as one surface, comprising:

- a. a computer comprising a plurality of data structures accessible to the computer, each data structure adapted to contain seismic data;
- b. a seismic data input device operatively connected to the computer; and
- a. a seismic data set computer program resident in the computer, adapted to relate a plurality the data structures containing seismic data representative of horizons which comprise a repeated surface to form a logically connected horizons data set

capable of responding to a single function operating on the logically connected horizons data set with a common response.